



## wwPDB EM Validation Summary Report ⓘ

May 10, 2025 – 02:28 PM EDT

PDB ID : 9BTC / pdb\_00009btc  
EMDB ID : EMD-44887  
Title : Cryo-EM density map of HKU1 spike glycoprotein D1 domain in complex with 9O-acetyl GD3 sialoglycan (Up state, locally refined)  
Authors : Jin, M.; Rini, J.M.  
Deposited on : 2024-05-14  
Resolution : 2.41 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

---

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev118  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4-5-2 with Phenix2.0rc1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.43.1

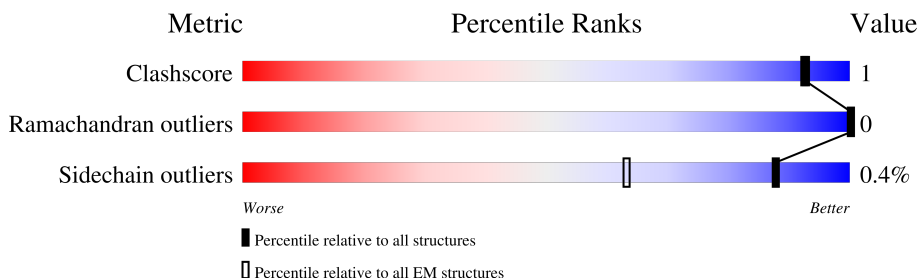
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.41 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1194	
2	B	5	
3	C	2	

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 2409 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

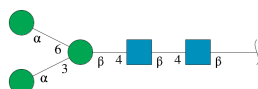
- Molecule 1 is a protein called Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	268	Total	C	N	O	S	0	0
			2192	1428	346	410	8		

There are 19 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	PRO	deletion	UNP Q5MQD0
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	ARG	deletion	UNP Q5MQD0
A	?	-	ARG	deletion	UNP Q5MQD0
A	?	-	LYS	deletion	UNP Q5MQD0
A	?	-	ARG	deletion	UNP Q5MQD0
A	?	-	ARG	deletion	UNP Q5MQD0
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	ILE	deletion	UNP Q5MQD0
A	?	-	SER	deletion	UNP Q5MQD0
A	?	-	ALA	deletion	UNP Q5MQD0
A	1010	PRO	THR	conflict	UNP Q5MQD0
A	1055	PRO	ALA	conflict	UNP Q5MQD0
A	1056	PRO	LEU	conflict	UNP Q5MQD0

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



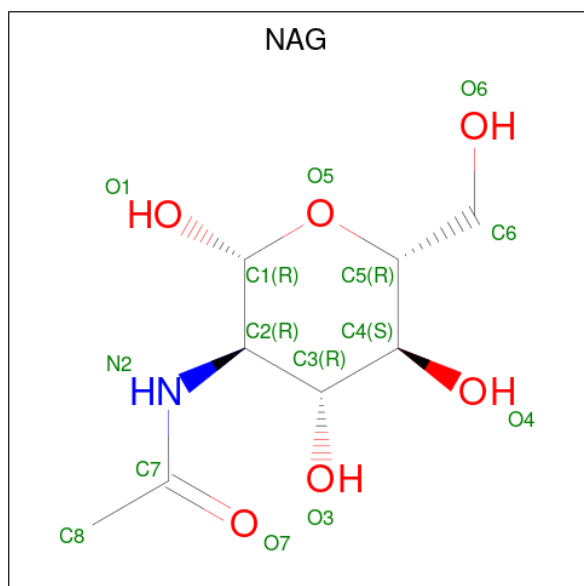
Mol	Chain	Residues	Atoms				AltConf	Trace
2	B	5	Total	C	N	O	0	0
			61	34	2	25		

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				AltConf	Trace
3	C	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				AltConf
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	
4	A	1	Total	C	N	O	0
			14	8	1	5	

*Continued on next page...*

Mol	Chain	Residues	Atoms				AltConf
4	A	1	Total 14	C 8	N 1	O 5	0
4	A	1	Total 14	C 8	N 1	O 5	0

- # A1AR1

Mol	Chain	Residues	Atoms				AltConf
5	A	1	Total	C	N	O	0
			44	24	2	18	

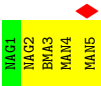


GLN  
GLN  
LEU  
MET  
PHE  
ASN  
LYS  
LYS  
PHE  
GLY  
ALA  
ILE  
SER  
SER  
SER  
LEU  
GLN  
GLU  
ARG  
ILE  
ILE  
SER  
SER  
ARG  
LEU  
ASP  
PRO  
GLY  
GLU  
ALA  
VAL  
GLN  
ILE  
ASP  
ARG  
LEU  
ILE  
ASN  
PRO  
TYR  
ASN  
GLY  
ARG  
LEU  
THR  
ALA  
MET  
HIS  
PHE  
ASN  
SER  
TYR  
VAL  
PRO  
GLN  
ILE  
GLN  
GLN  
SER  
LEU  
LEU  
VAL  
PRO  
GLU  
PRO  
ILE  
SER  
ASN  
LYS  
ASN  
VAL  
VAL  
PHE  
MET  
HIS  
PHE  
ASN  
SER  
CYS  
SER  
VAL  
ASN  
ILE  
GLN  
SER  
TYR  
TYR  
PRO  
GLU  
PRO  
ILE  
SER  
ASN  
LYS  
ASN  
VAL  
VAL  
PHE  
MET  
HIS  
PHE  
ASN  
SER  
CYS  
SER  
VAL  
ASN  
ILE  
SER  
PHE  
THR  
LYS  
ALA  
PRO  
LEU  
VAL  
VAL  
SER  
PRO  
LYS  
PHE  
GLY  
LEU  
CYS  
ALA  
ALA  
ILE

LEU  
ALA  
MET  
GLU  
VAL  
GLY  
VAL  
ASN  
GLU  
CYS  
VAL  
VAL  
GLY  
SER  
SER  
GLN  
SER  
PRO  
GLN  
ARG  
ILE  
ILE  
ASN  
ASP  
HIS  
HIS  
TRP  
MET  
PHE  
THR  
GLY  
GLY  
ASN  
PRO  
GLU  
SER  
SER  
TYR  
TYR  
TYR  
PRO  
VAL  
GLU  
PRO  
ILE  
SER  
ASN  
LYS  
ASN  
VAL  
VAL  
PHE  
MET  
HIS  
PHE  
ASN  
SER  
CYS  
SER  
VAL  
ASN  
ILE  
SER  
PHE  
THR  
LYS  
ALA  
PRO  
LEU  
VAL  
VAL  
SER  
PRO  
LYS  
PHE  
GLY  
LEU  
CYS  
ALA  
ALA  
ILE

SER  
GLY  
ASP  
VAL  
GLY  
ILE  
ALA  
PRO  
LYS  
GLN  
GLN  
TYR  
PHE  
ILE  
ILE  
HIS  
HIS  
ASN  
ASP  
HIS  
TRP  
MET  
PHE  
THR  
GLY  
GLY  
ASN  
PRO  
GLU  
SER  
SER  
TYR  
TYR  
TYR  
PRO  
VAL  
GLU  
PRO  
ILE  
SER  
ASN  
LYS  
ASN  
VAL  
VAL  
PHE  
MET  
HIS  
PHE  
ASN  
SER  
CYS  
SER  
VAL  
ASN  
ILE  
SER  
PHE  
THR  
LYS  
ALA  
PRO  
LEU  
VAL  
VAL  
SER  
PRO  
LYS  
PHE  
GLY  
LEU  
CYS  
ALA  
ALA  
ILE

● Molecule 2: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



● Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	3576676	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	36	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	75000	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	2.718	Depositor
Minimum map value	-1.241	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.031	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	362.56, 362.56, 362.56	wwPDB
Map dimensions	352, 352, 352	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.03, 1.03, 1.03	Depositor



## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, BMA, MAN, A1AR1

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.69	0/2256	1.14	2/3076 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	220	THR	CA-CB-OG1	6.32	119.08	109.60
1	A	142	HIS	CB-CG-CD2	-5.01	124.68	131.20

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	49	TYR	Sidechain

### 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2192	0	2102	6	0
2	B	61	0	52	0	0
3	C	28	0	25	0	0
4	A	84	0	78	0	0
5	A	44	0	0	0	0
All	All	2409	0	2257	6	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 1.

The worst 5 of 6 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:201:HIS:ND1	1:A:220:THR:HG21	2.24	0.52
1:A:49:TYR:HB3	1:A:220:THR:CG2	2.47	0.44
1:A:195:THR:HG21	1:A:215:ASP:O	2.20	0.42
1:A:137:ILE:HD12	1:A:150:ALA:HB2	2.02	0.41
1:A:66:TYR:CZ	1:A:263:LYS:HE3	2.56	0.41

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	266/1194 (22%)	241 (91%)	25 (9%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM

entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	247/1073 (23%)	246 (100%)	1 (0%)	89 95

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	213	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	234	HIS
1	A	243	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates ⓘ

7 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	NAG	B	1	2,1	14,14,15	1.02	0	17,19,21	0.83	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAG	B	2	2	14,14,15	1.32	3 (21%)	17,19,21	0.62	0
2	BMA	B	3	2	11,11,12	1.47	2 (18%)	15,15,17	0.82	1 (6%)
2	MAN	B	4	2	11,11,12	1.35	2 (18%)	15,15,17	0.75	0
2	MAN	B	5	2	11,11,12	1.42	2 (18%)	15,15,17	0.95	1 (6%)
3	NAG	C	1	3,1	14,14,15	1.17	2 (14%)	17,19,21	0.88	1 (5%)
3	NAG	C	2	3	14,14,15	1.24	2 (14%)	17,19,21	0.91	1 (5%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	B	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1
2	BMA	B	3	2	-	0/2/19/22	0/1/1/1
2	MAN	B	4	2	-	0/2/19/22	0/1/1/1
2	MAN	B	5	2	-	0/2/19/22	0/1/1/1
3	NAG	C	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	C	2	3	-	1/6/23/26	0/1/1/1

The worst 5 of 13 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	5	MAN	O5-C5	2.93	1.49	1.43
2	B	4	MAN	O5-C5	2.84	1.49	1.43
3	C	2	NAG	O5-C5	2.65	1.48	1.43
2	B	3	BMA	O5-C5	2.65	1.48	1.43
2	B	2	NAG	O5-C5	2.61	1.48	1.43

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	2	NAG	C1-O5-C5	2.89	116.06	112.19
2	B	3	BMA	C1-O5-C5	2.51	115.55	112.19
2	B	5	MAN	C1-O5-C5	2.27	115.23	112.19
3	C	1	NAG	C1-O5-C5	2.03	114.91	112.19

There are no chirality outliers.

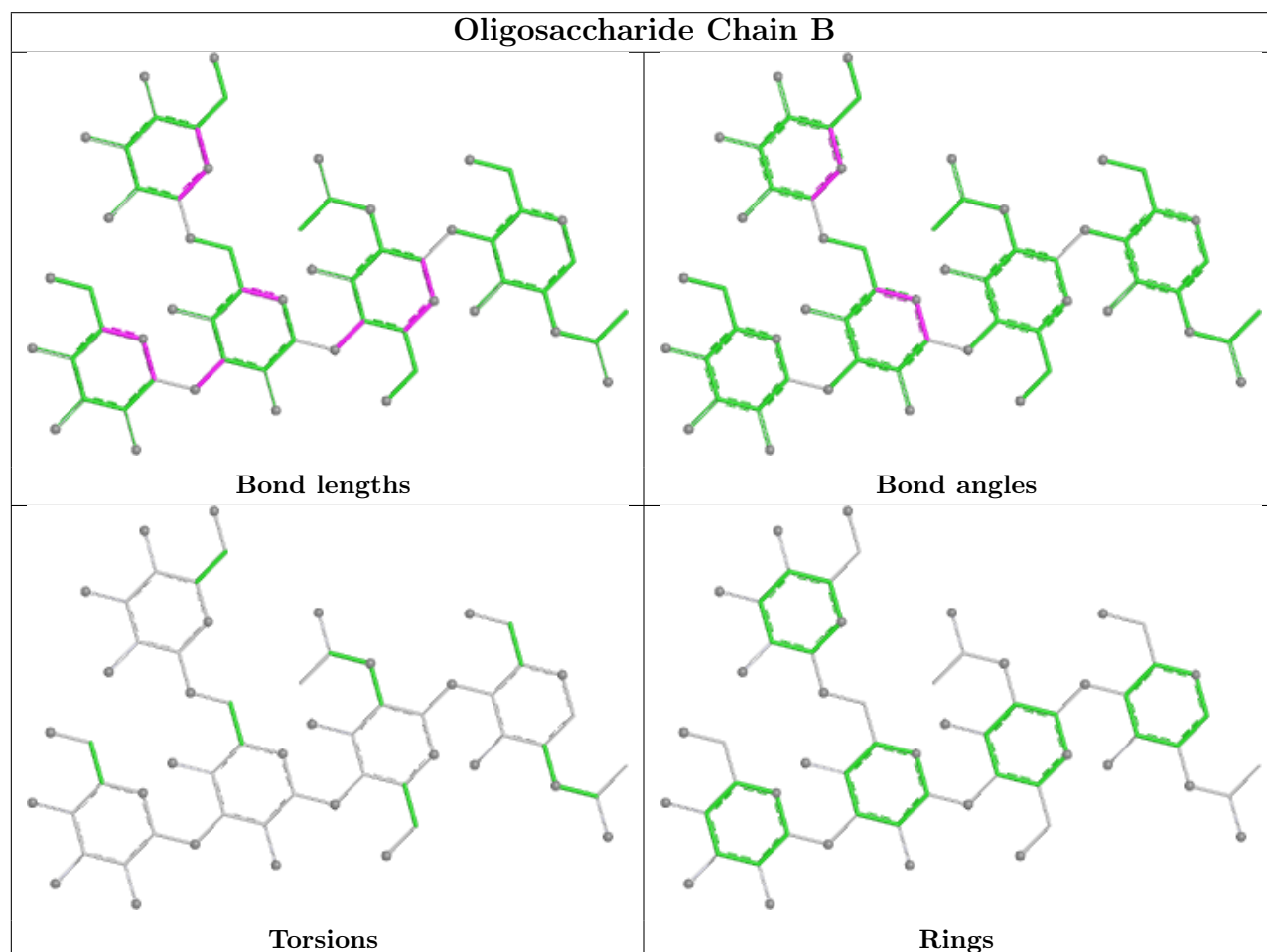
All (3) torsion outliers are listed below:

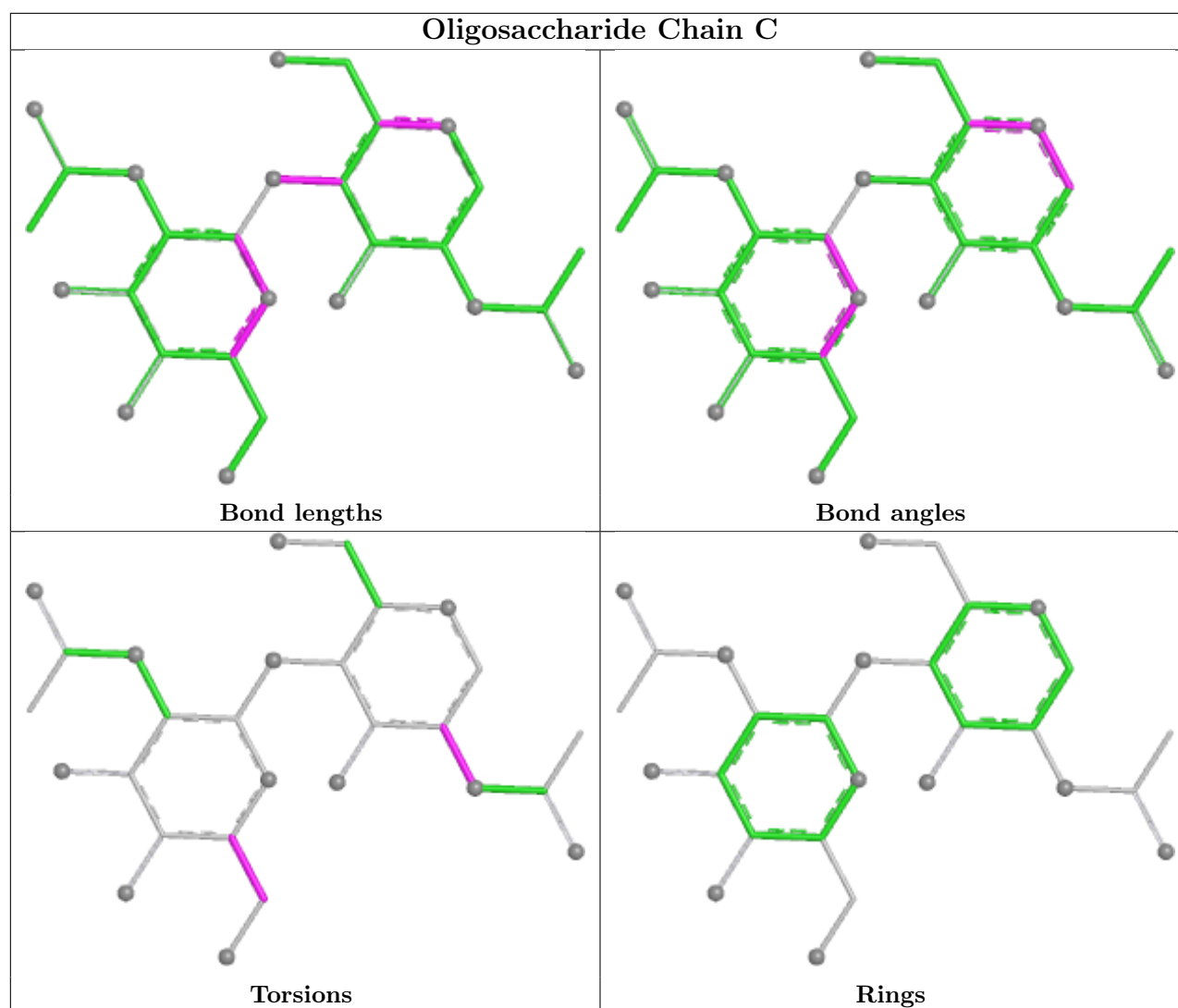
Mol	Chain	Res	Type	Atoms
3	C	2	NAG	O5-C5-C6-O6
3	C	1	NAG	C1-C2-N2-C7
3	C	1	NAG	C3-C2-N2-C7

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.





## 5.6 Ligand geometry [i](#)

7 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z  > 2$	Counts	RMSZ	# $ Z  > 2$
4	NAG	A	1306	1	14,14,15	1.22	1 (7%)	17,19,21	0.90	1 (5%)
4	NAG	A	1305	1	14,14,15	1.15	1 (7%)	17,19,21	0.97	1 (5%)
4	NAG	A	1302	1	14,14,15	1.20	1 (7%)	17,19,21	0.94	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	A	1304	1	14,14,15	1.25	2 (14%)	17,19,21	0.99	1 (5%)
4	NAG	A	1303	1	14,14,15	1.19	1 (7%)	17,19,21	0.77	0
4	NAG	A	1301	1	14,14,15	1.29	2 (14%)	17,19,21	0.67	0
5	A1AR1	A	1307	-	44,45,45	1.59	10 (22%)	55,67,67	1.25	6 (10%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	A	1306	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1305	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1302	1	-	2/6/23/26	0/1/1/1
4	NAG	A	1304	1	-	2/6/23/26	0/1/1/1
4	NAG	A	1303	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1301	1	-	0/6/23/26	0/1/1/1
5	A1AR1	A	1307	-	-	7/47/84/84	0/2/2/2

The worst 5 of 18 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1307	A1AR1	C21-C12	4.86	1.61	1.53
5	A	1307	A1AR1	C41-C51	3.22	1.56	1.53
5	A	1307	A1AR1	C31-C21	2.90	1.55	1.51
4	A	1302	NAG	O5-C5	2.86	1.49	1.43
4	A	1304	NAG	O5-C5	2.84	1.49	1.43

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1307	A1AR1	O6-C2-C3	-3.67	106.41	111.35
4	A	1305	NAG	C1-O5-C5	3.43	116.78	112.19
5	A	1307	A1AR1	O1B1-C12-C21	-3.14	118.61	123.85
5	A	1307	A1AR1	O6-C6-C5	-3.12	106.99	109.84
4	A	1306	NAG	C1-O5-C5	2.70	115.80	112.19

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

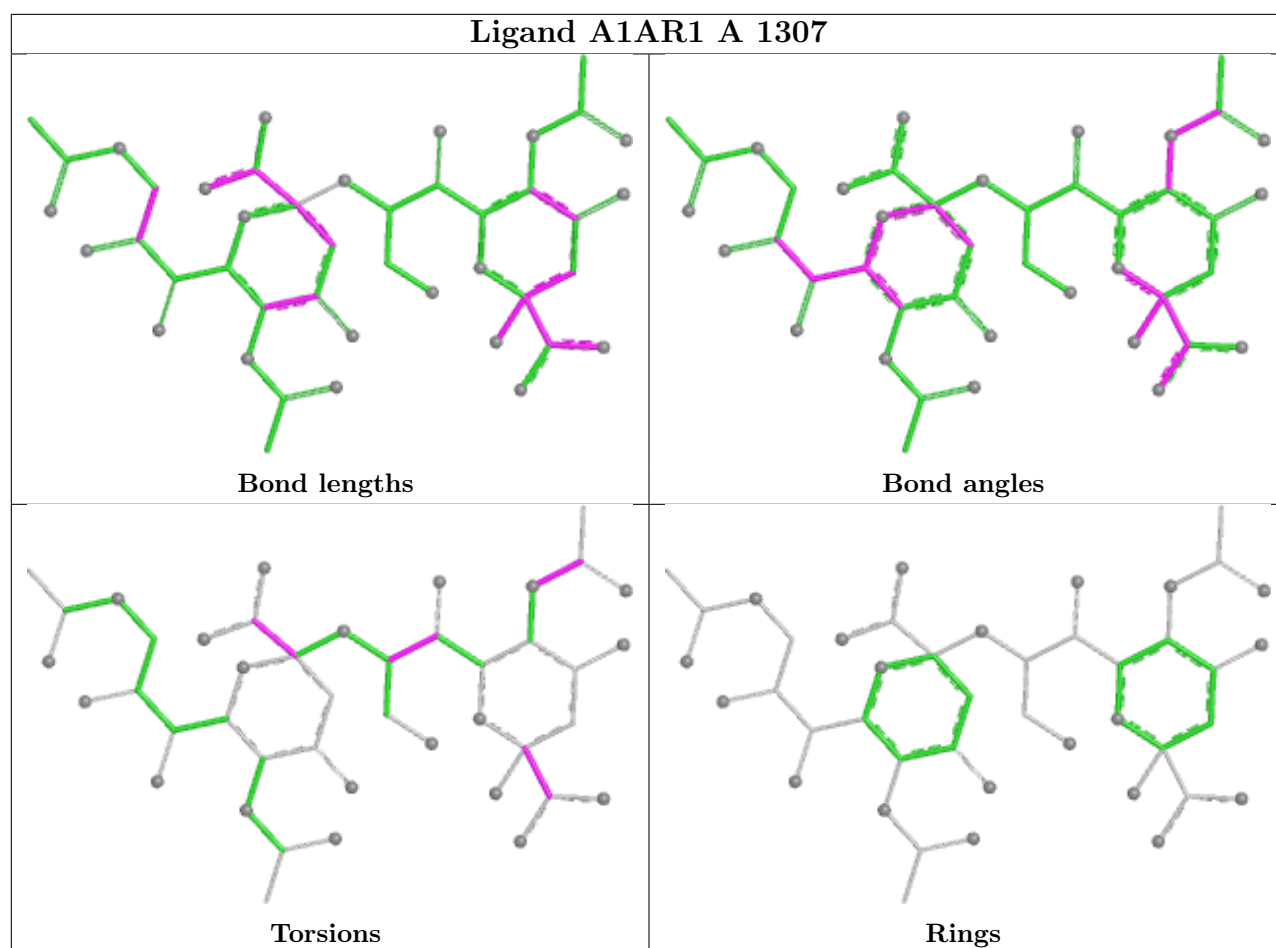
Mol	Chain	Res	Type	Atoms
5	A	1307	A1AR1	O1A-C1-C2-O81
5	A	1307	A1AR1	C111-C101-N51-C51
5	A	1307	A1AR1	O101-C101-N51-C51
5	A	1307	A1AR1	C61-C71-C81-C91
4	A	1302	NAG	C1-C2-N2-C7

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

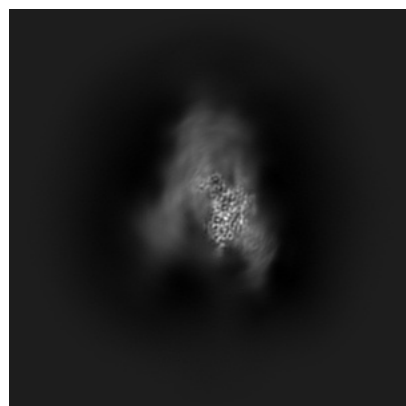
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44887. These allow visual inspection of the internal detail of the map and identification of artifacts.

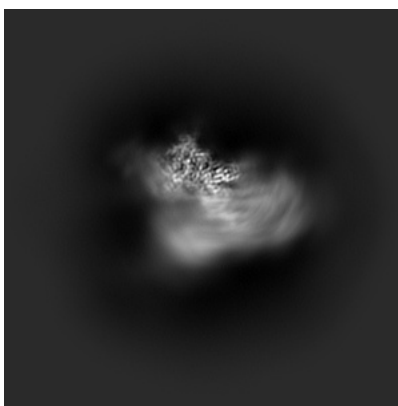
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

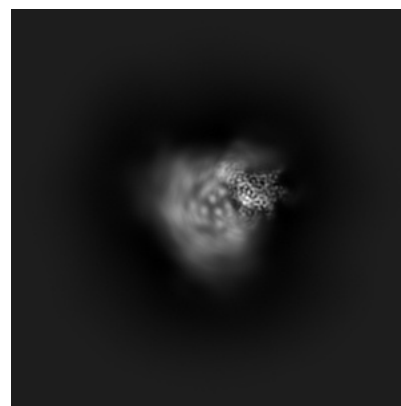
#### 6.1.1 Primary map



X

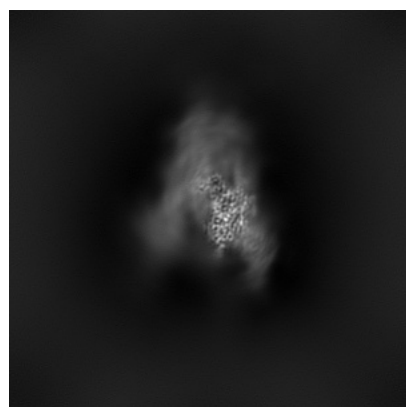


Y

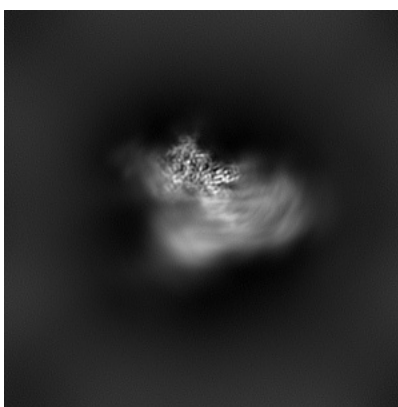


Z

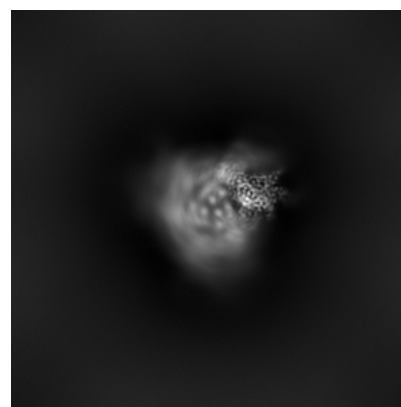
#### 6.1.2 Raw map



X



Y



Z

The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

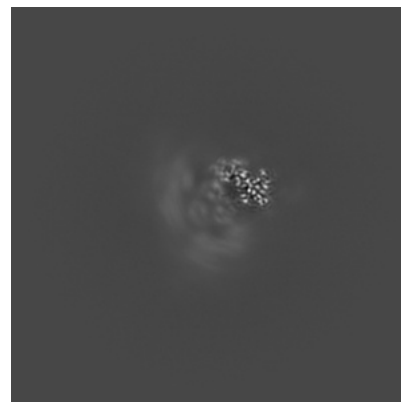
### 6.2.1 Primary map



X Index: 176

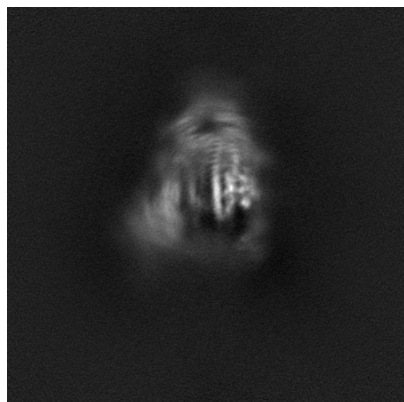


Y Index: 176

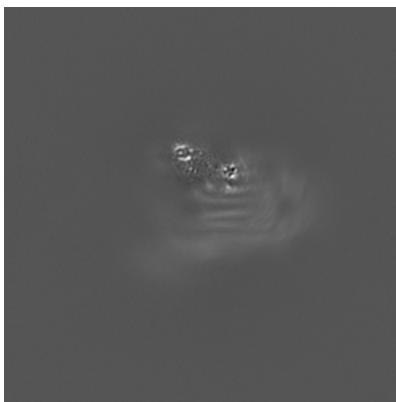


Z Index: 176

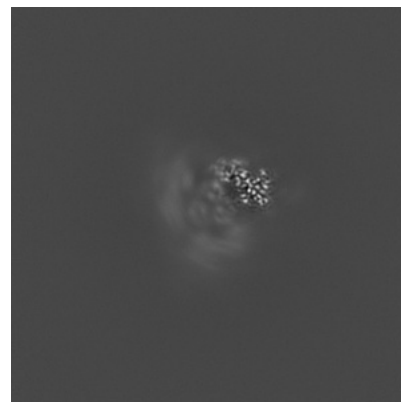
### 6.2.2 Raw map



X Index: 176



Y Index: 176

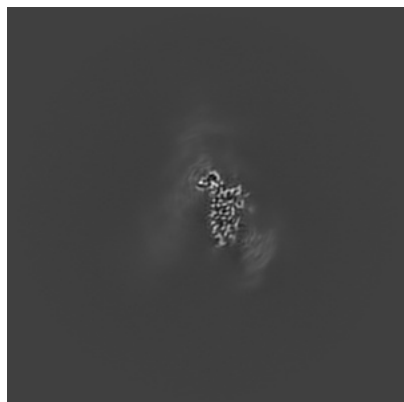


Z Index: 176

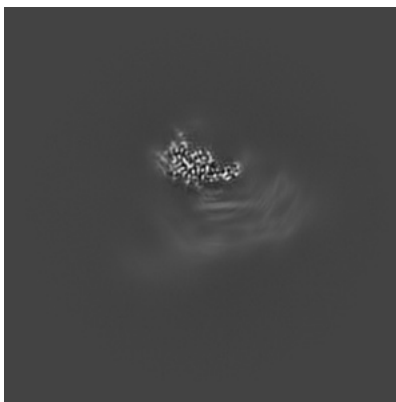
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

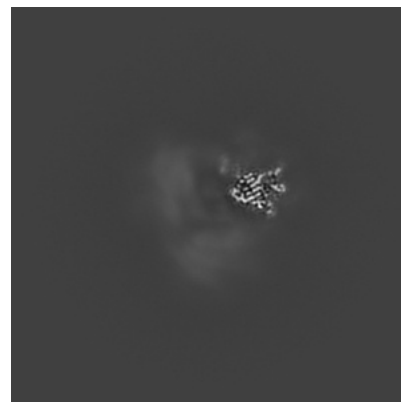
### 6.3.1 Primary map



X Index: 205

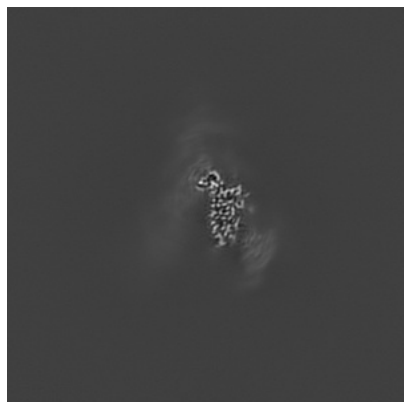


Y Index: 184

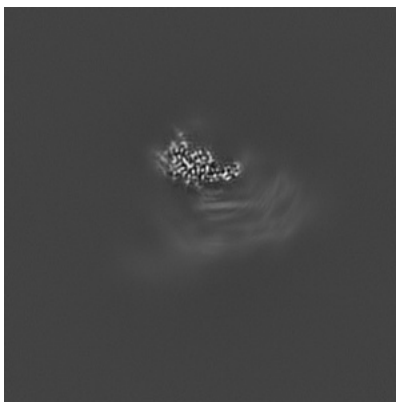


Z Index: 162

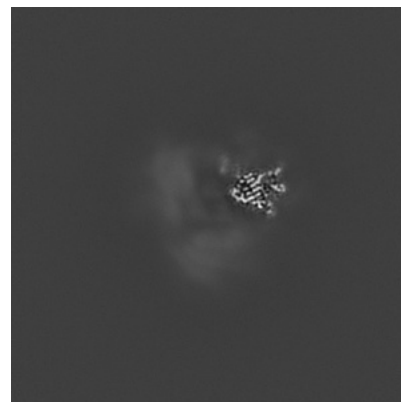
### 6.3.2 Raw map



X Index: 205



Y Index: 184

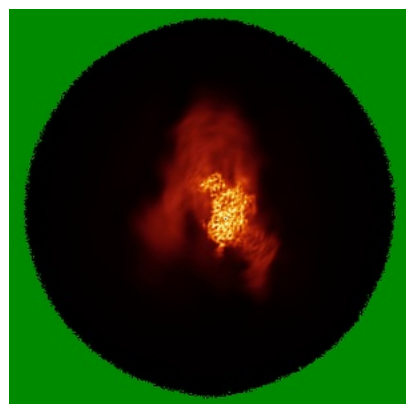


Z Index: 162

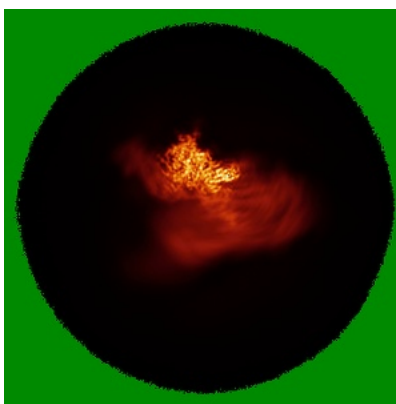
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

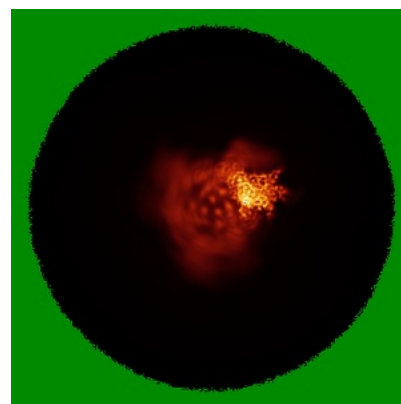
### 6.4.1 Primary map



X

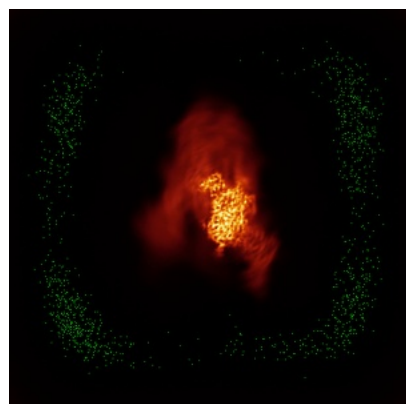


Y

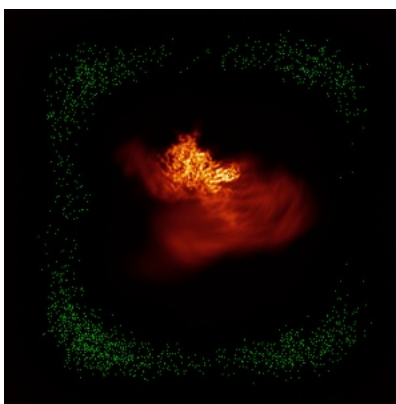


Z

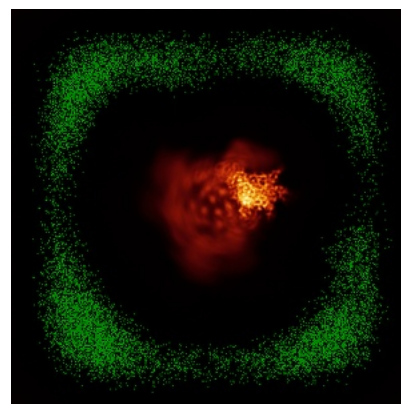
### 6.4.2 Raw map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

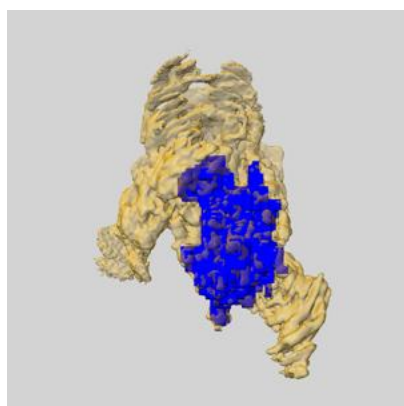
## 6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

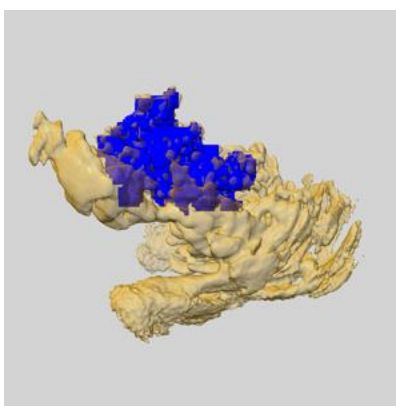
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

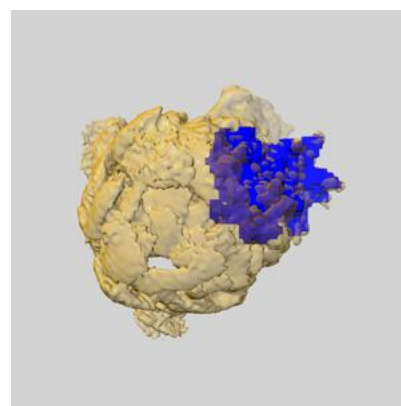
### 6.6.1 emd\_44887\_msk\_1.map [i](#)



X



Y

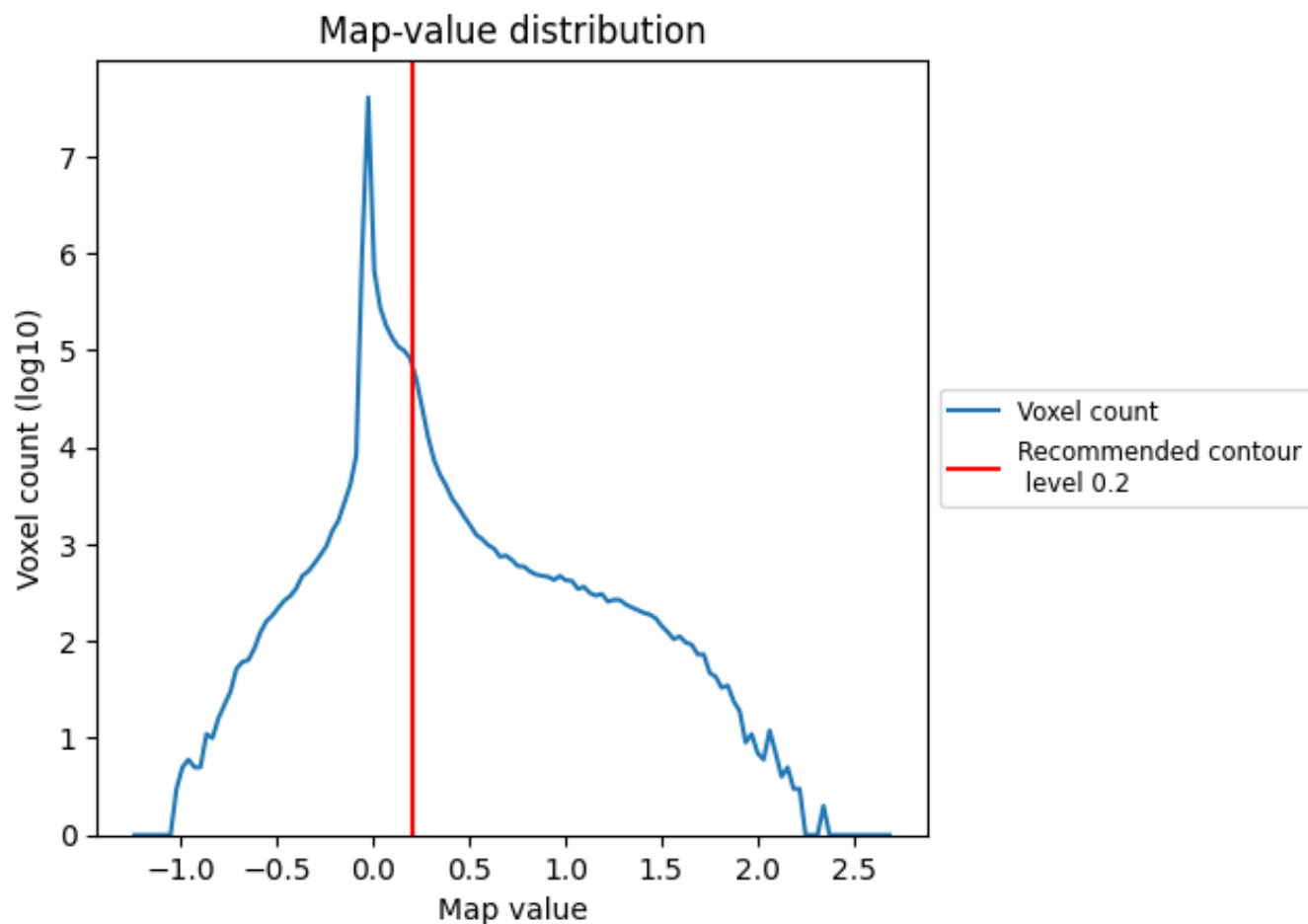


Z

## 7 Map analysis [i](#)

This section contains the results of statistical analysis of the map.

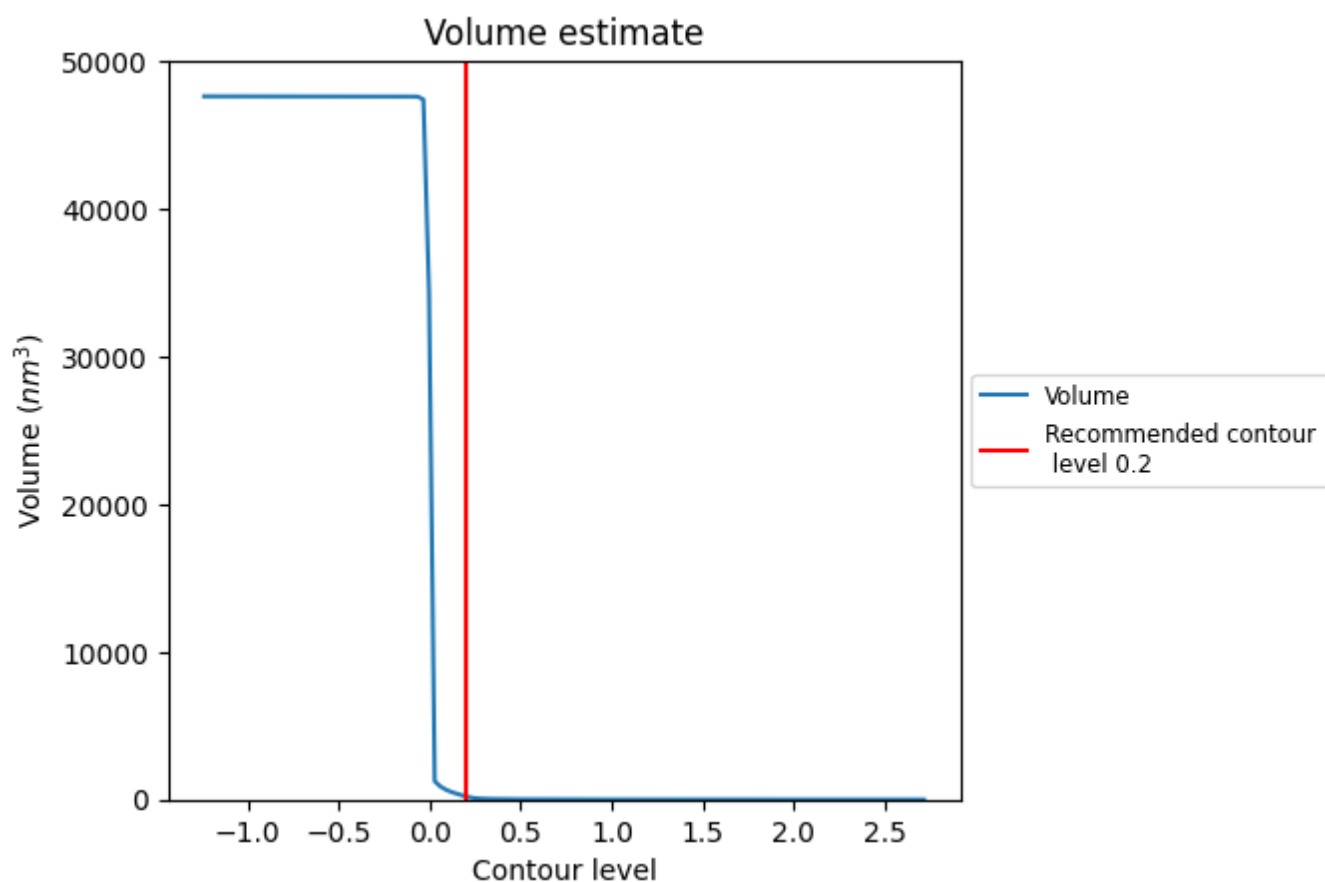
### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.



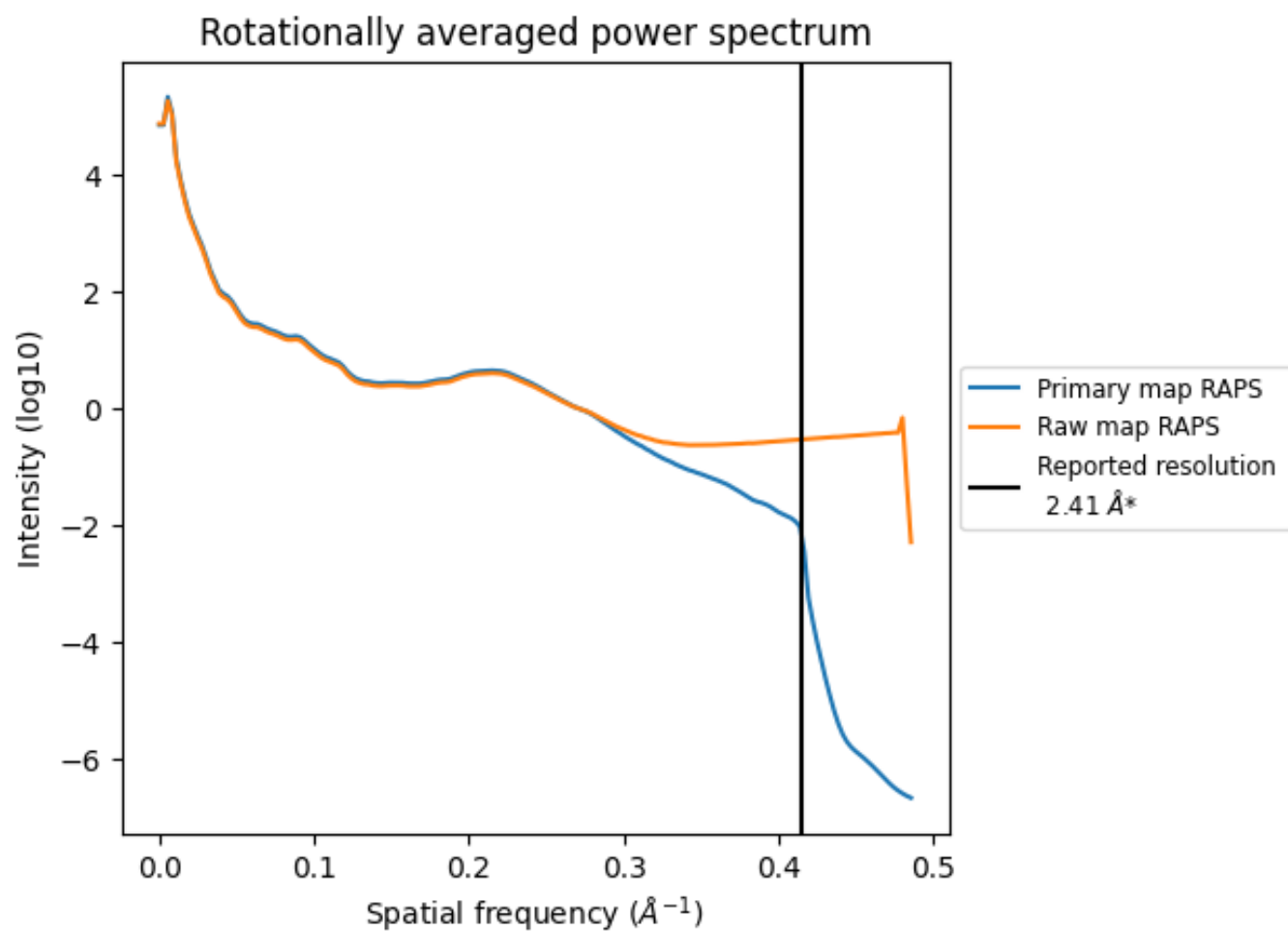
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 212 nm<sup>3</sup>; this corresponds to an approximate mass of 192 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum ⓘ

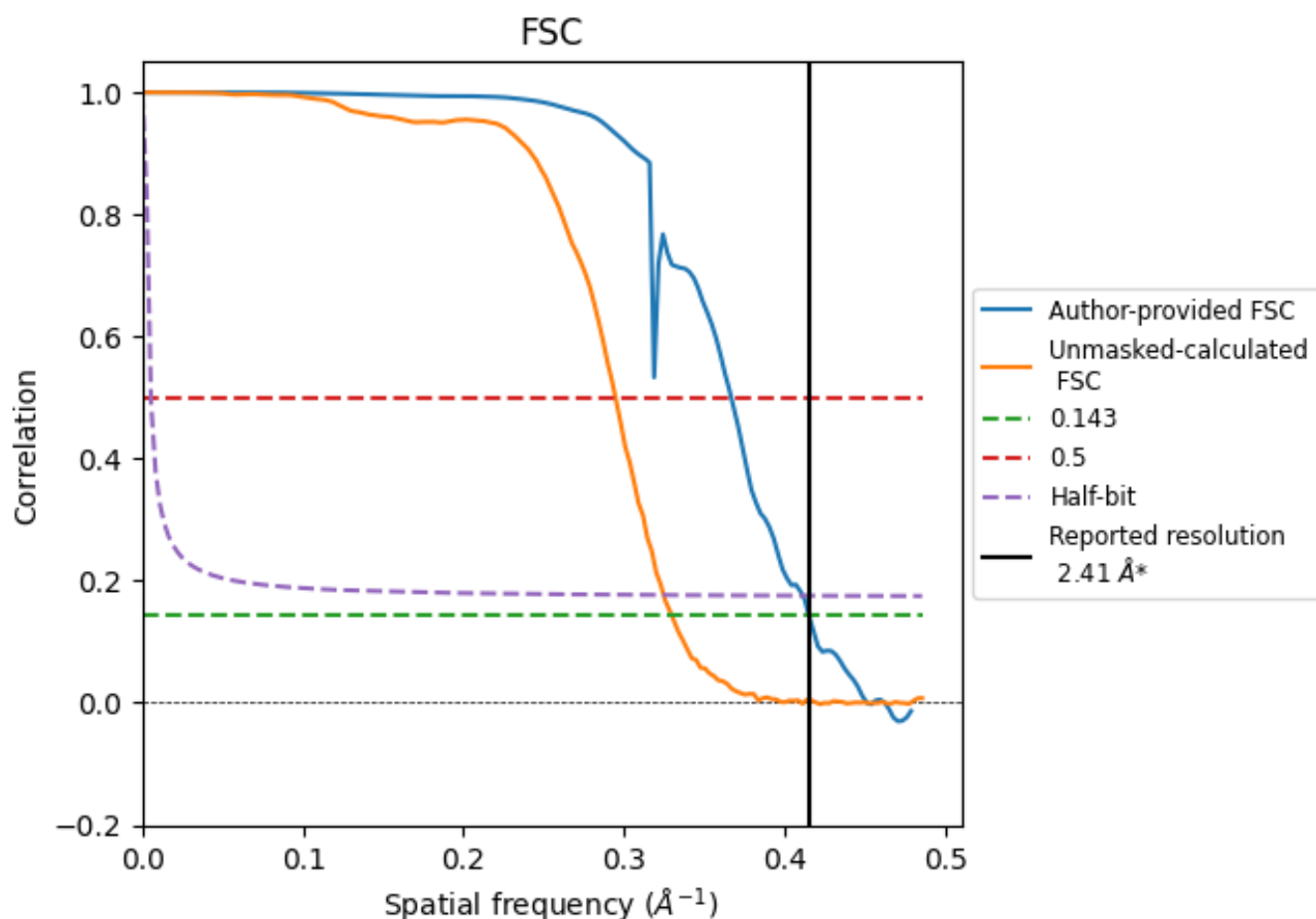


\*Reported resolution corresponds to spatial frequency of 0.415 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.415  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

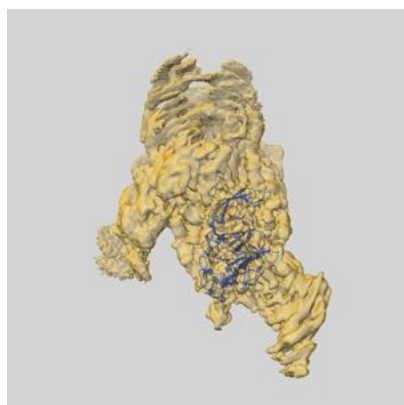
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.41	-	-
Author-provided FSC curve	2.41	2.73	2.43
Unmasked-calculated*	3.03	3.39	3.08

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.03 differs from the reported value 2.41 by more than 10 %

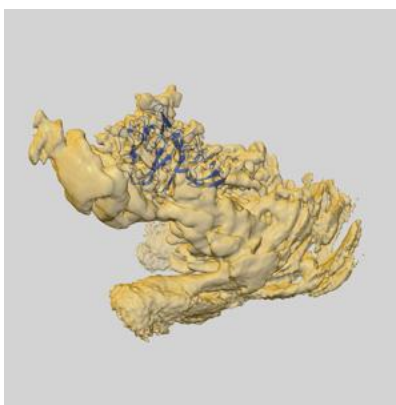
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-44887 and PDB model 9BTC. Per-residue inclusion information can be found in section [3](#) on page [6](#).

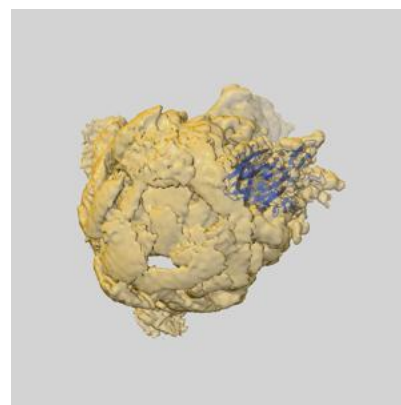
### 9.1 Map-model overlay [i](#)



X



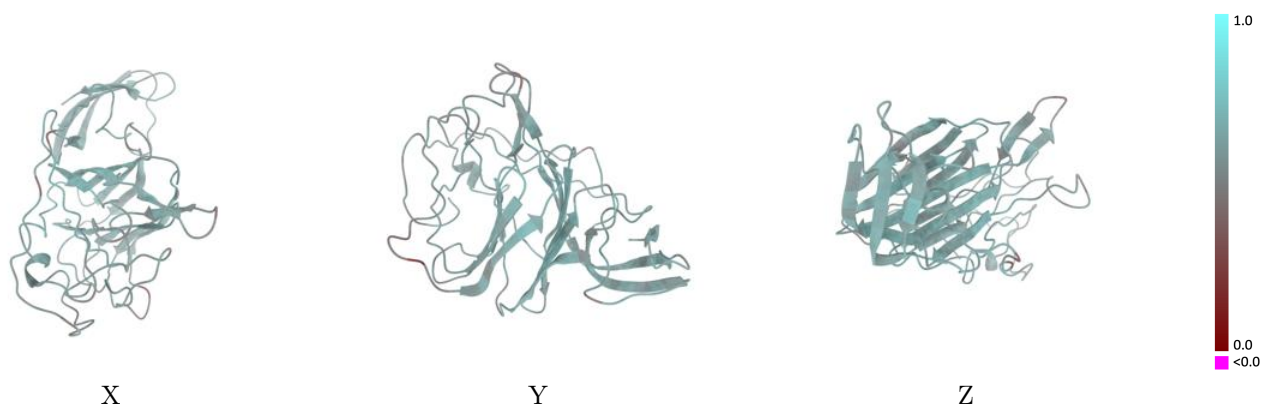
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



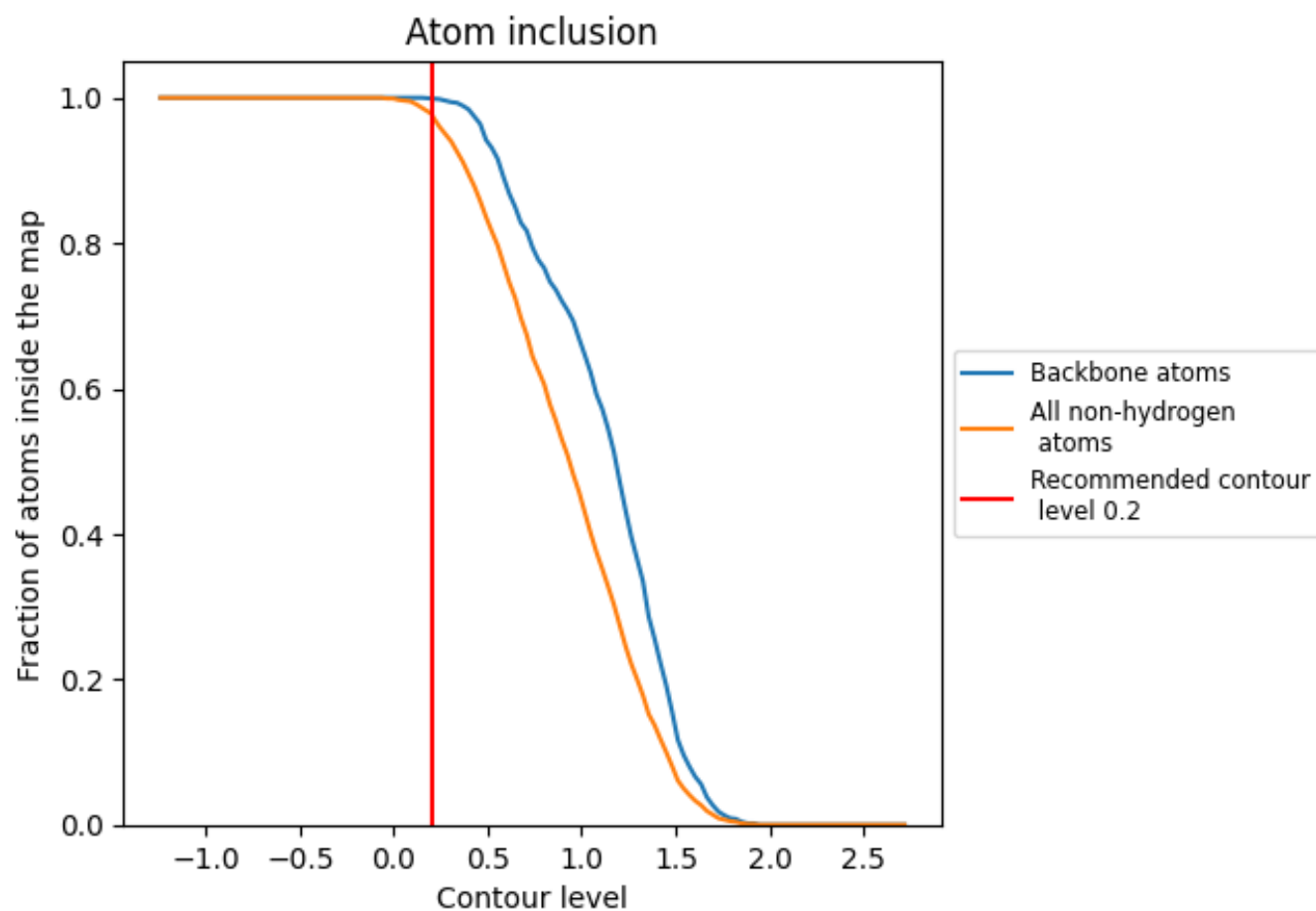
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.2).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 100% of all backbone atoms, 98% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.9780	<div></div> 0.5660
A	<div></div> 0.9820	<div></div> 0.5720
B	<div></div> 0.8360	<div></div> 0.3930
C	<div></div> 0.9640	<div></div> 0.4750

